

"Philosophy, Language, Neuroscience"

(Outline)

- I. Me as (neuro-)philosopher
- II. Metaphysics as branch of philosophy
Definition.
- III. In particular the mind-body problem
"What sorts of things have minds, and how do we know?"
- IV. Descartes' remark about language use and the Turing test
Quote the passages.
- V. Another view about the m-b problem: Materialism
Explanation of this view. Bunge hypothesis.
- VI. Physiological psychology to provide evidence for the materialist
Why you'd think this.
- VII. But we can stick to language through Broca & Wernicke
Explain the kinds of aphasia, use brain slides and talk about anatomy -> clinical aspects
- VIII. Division of function vs. unified soul - explain Descartes' views
Comment that we seem to have divided up the functions of stuff; compare with Descartes

Today we switch gears a little. Since this course is listed in the philosophy department, Professor Tenny and I have decided to take advantage of this opportunity to do a little philosophy with you. Since she's a linguist and I'm a philosopher, I have offered to give this lecture today.

There are many schools of philosophy. One recent (i.e. in the last 20 years or so) one that has proved both interesting and controversial is called "neurophilosophy." This approach recognizes the importance of the neurosciences to address, inform, and constrain philosophical speculation. While I do not do all of my work in this area, I would like to think that at least some of the time I adopt the tenets of this school in the broad outlines I have just given.

One area where neuroscience is especially important is in a

traditional area of philosophy known as metaphysics. This is the area of philosophy concerned with the most general nature of reality. For instance, metaphysicians have worried about the nature of time, causation, how part-whole relations work and what the nature of properties is.

One age-old question in metaphysics is the so-called "mind-body problem." In today's talk I am going to talk about this question through a field we have briefly discussed earlier in class, neurolinguistics.

First, then, what is the mind-body problem? It can be broken down into two questions, which can be summarized in the following way:

"What sorts of things have minds, and how do we know?"

The French mathematician, philosopher and scientist, Descartes, who some of you have no doubt heard of (e.g. in the Cartesian coordinate system used in analytic geometry, a field he invented), had an interesting answer to this question. Early in the 17th century, he wrote about this, giving a language-oriented answer. This is convenient for our purposes - after all, this is a course on the nature of language. And as we shall see, we can use modern science to get a handle on this problem through language too. Some passages from Descartes are reproduced from the Sutcliffe translation in your handout.

<read passage 1>

<read passage 2>

What does Descartes say in these two passages that is important for our considerations? Well, he says that machines and beasts (i.e. non-human animals) could not use words and signs the way humans do, and further points out that this is not due to lack of organs on their part, as certain birds can reproduce **sounds** of the appropriate kind.

Those of you who know the work of Alan Turing, in particular, his famous "Turing Test", may hear echoes of his work in Descartes

here.

But there are important differences. Descartes draws several conclusions from his hypothesis that Turing would probably have disputed. The most important ones for our purposes concern the immaterial soul, and its indivisibility.

Instead of organ differences, says Descartes, it is the souls of humans that account for the difference between humans and other animals and humans and machines. This feature is described by Descartes in the second of the two parts that I have handed out to you. Here we can read "soul" as being synonymous with "mind", as far as Descartes is concerned. At this stage someone may well wonder why Descartes thinks souls are indivisible. This question is a good one, and not exactly easy to answer. Basically, it has to do with what he takes to be essential feature of matter - what souls are not. He takes extension to be this essential feature. If souls are not matter, as Descartes claims, then they cannot possibly be extended for that reason. There is possibly also an argument, dating to Plato, that anything divisible could in principle be divided, hence destroyed. But souls for Descartes are supposed to be immortal, hence not destroyable.

Suppose one disputed the first part of Descartes' viewpoint here. Descartes argues that if there is an immaterial soul, it must be indivisible. He also explains, as we saw, that this soul is responsible for language. So, if we can show that the language faculty is divisible, we have provided an argument against his immaterialism and, in particular, his views on the mind-body problem.

A family of viewpoints that denies the existence of immaterial things is called, quite logically, "materialism." To avoid the charge that immaterialism and materialism are simply denying each other's premisses, some materialists have adopted a positive thesis for materialists to defend. This is the hypothesis that whatever exists possesses energy. We shall not need this in what follows, but it is important philosophically that I mention it.

Since we saw above that Descartes denies the divisibility of the

soul, we take this as our starting point. Here are the brain systems implicated in language use.

[picture]

Recall from previous lectures that each of these parts, the Broca area, the Wernicke area, and the arcuate fasciculus, a nerve fibre bundle which joins the Broca and Wernicke areas, mediates a different function of language and understanding. There is a fourth important part, not shown, the primary auditory area. We need not deal too much with this, as Descartes can allow for what happens when this area is damaged - namely reduction of auditory function in the broad sense. However, what happens when one of the three other parts is damaged is more interesting.

Speaking broadly, damage to each produces a specific kind of **language** impairment, called an **aphasia**. Patients who suffer from the so called Broca aphasia are described by the neuroscientist Geschwind as follows:

"... characteristically produces little speech, which is emitted slowly, with great effort and with poor articulation."

This occurs both at the phonemic and morphological levels, as can be seen by the Broca aphasic's dropping of endings and small grammatical words like "the." Nevertheless, the Broca aphasic can understand spoken language quite fine, and in many cases even retain his ability to sing!

By contrast, the Wernicke aphasics are capable of the usual effortless speech most of us are accustomed to. However, what they say is remarkably empty. The patient is also unable to understand spoken language though has no elementary impairment of hearing. I.e. she is clearly **hearing**, so it is not a disorder of reception. (In particular, her auditory nerves are more or less intact.)

In addition, while it is rare, it is also known what happens when the arcuate fasciculus is cut. When this happens, patients suffer from a condition called "conduction aphasia", though other trauma may produce the same results. In this condition, patients

occasionally employ the wrong words for things, but have intact comprehension. On the other hand, they are grossly unable to repeat spoken language, and for some reason have the hardest trouble with small words like "the", "if" and "is." "No ifs, ands or buts" is extremely difficult for them to say. Nobody is quite sure why this feature of the condition exists.

It is important to realize that for a diagnosis of aphasia to be applied, in this respect the patient must not have general cognitive or muscle control defects. Thus we have a division in several respects relevant to Descartes' arguments.

Descartes would not have course denied that there can be impairments of language. However, one would think that the division of language into subfunctions based on their location in appropriate brain anatomy (and Descartes himself was a student of anatomy!) would give him pause.

Let's look at how the counterargument to Descartes is to go. Descartes had claimed that (a) language is an ability of souls and (b) souls are indivisible. Yet, we are able to see in the case of patients with the above impairments (and other even stranger conditions!) that many features of language: comprehension, production of certain words, and so on, are divisible. This suggests there is no soul of the kind Descartes suggested.

Of course, there are many what are called *ad hoc* hypotheses to defend Descartes' viewpoint, and responses to those, and so on, but that is another story for another time.